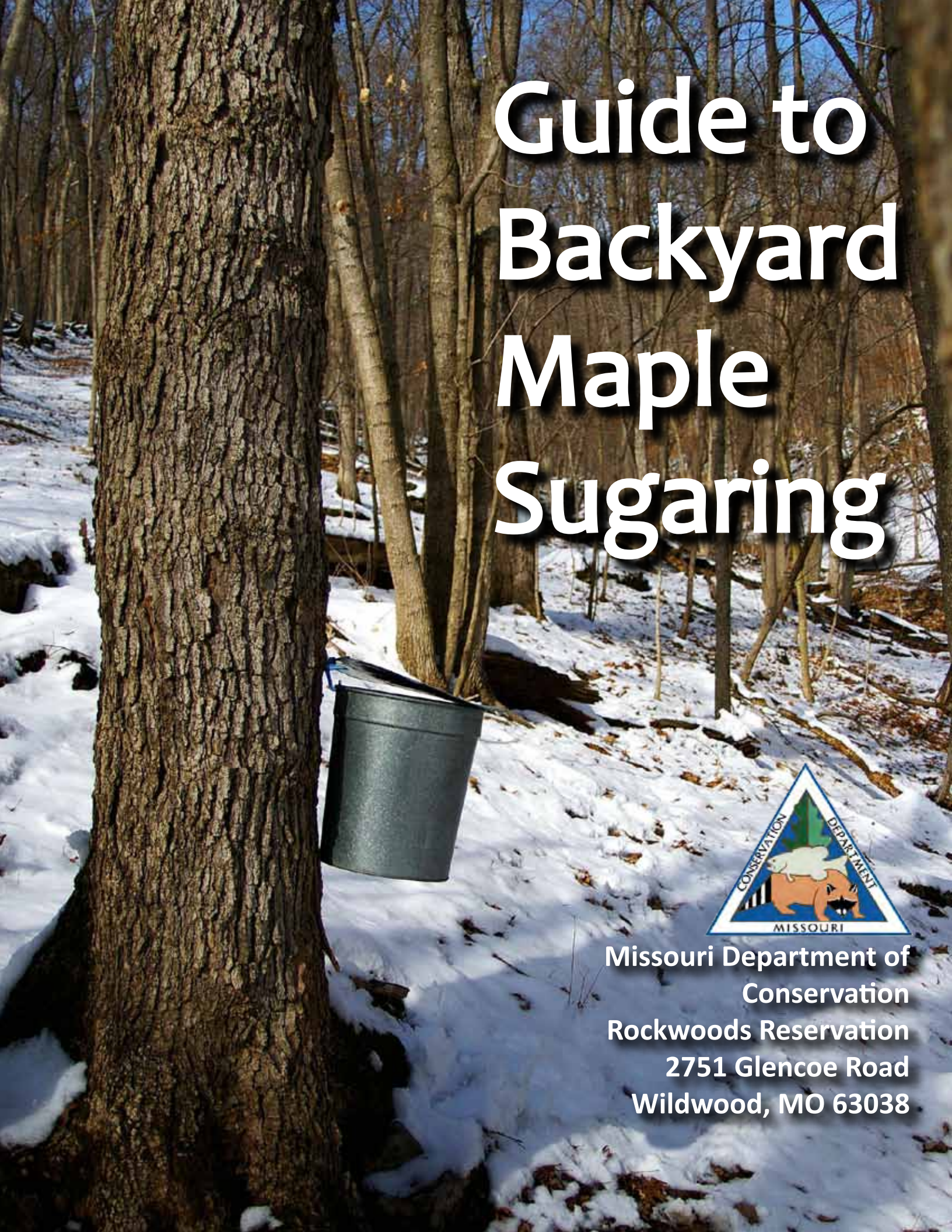

Guide to Backyard Maple Sugaring

Missouri Department of Conservation
Rockwoods Reservation
2751 Glencoe Road
Wildwood, MO 63038

Introduction

Many people think of maple sugaring as only being done in the northeastern United States because forests in this region have a high concentration of sugar maple trees. While this is where the largest source of maple syrup is produced in the United States, syrup can be made wherever sugar maple trees are found. As early as the 1860's census, Missouri recorded producing as much as 18,289 gallons of maple syrup. Missouri's forests are typically composed of oak and hickory trees but sugar maples have always been present here and the tradition of making syrup has long been a pastime. Conservation means to "wisely use" and over time, maple farmers have learned how to do just that. In this brochure, you will find basic instructions for you to follow so you too can begin your maple sugaring adventure.

As you begin your own maple sugaring journey, it is important to remember that you can start with just one tree or use as many as you want. It is up to you how small or big you want your production to be and how much time you have to dedicate to the process.

Rockwoods
Naturalists

A Note from the Foresters

Please don't plant sugar maple trees. Unfortunately, sugar maple trees create and tolerate dense shade, making growth difficult for more beneficial forest plants, oak and hickory trees. While planting is not recommended, we do encourage you to take advantage of sugar maple trees for their sweet treasure if you already have them. Please contact a Forester at Rockwoods Reservation at 636-458-2236 to learn more about managing your forests for wildlife, wood products, recreation, scenery and more.

Before You Begin

Time and Commitment

A lot of time is needed throughout the sugar making process. You'll need to devote time to learning about the sugar making process, identifying sugar maple trees, cleaning all equipment, tapping trees, hanging buckets, collecting sap each day and devoting hours for boiling and finishing the sap. Your involvement can be significant depending upon how many trees you tap, how much syrup you wish to produce and the efficiency of how you cook your sap. When the season is over, plan on removing taps and cleaning all equipment for the following year.

Maple Trees

Sugar maple trees are not found in every region of Missouri. It is important to see how many sugar maple trees you have as well as the size(s) of your tree(s). Knowing this will allow you to know approximately how much sap you might yield in the season. **See "The Size Must Be Right" chart on page #2.**

Financial Commitment

The amount of money you want to devote to making syrup depends upon the type of equipment you wish to use. You can purchase industrial equipment for the backyard sugarer from a variety of maple sugar outfitters or you can be creative and make much of your equipment from items you have lying around your house. We recommend re purposing household supplies when getting started on a smaller scale. Creating taps, collection containers and cooking supplies is a fun way for the whole family to be a part of the conservation of our resources.

Labor Requirements

The larger your operation, the more labor will be required. If you plan to hang buckets on your trees, you'll need to have the stamina to collect the sap from your trees each day and bring it to your evaporator.

> Maple Sugaring is a labor of love! Winter has taken on a whole new level of excitement and we hope you and your family experiences the same.
> ~Rockwoods Naturalists

Getting Started

Why Sugar Maples?

While a variety of deciduous trees can be used to make syrup, sugar maples are best because they contain the highest concentration of sugar in their sap; up to 3%. The higher sugar content means that less sap and less labor are required to produce syrup.

- 40 gallons of sap = 1 gallon of syrup

Identifying Sugar Maples

It is easiest to identify sugar maple trees during the spring, summer or fall when the leaves are present, but if this is not possible, you can pick up a copy of MDC's ***"Key to MO Trees in Winter"*** to assist you in identifying your winter trees. The following are key features to note while trying to identify sugar maples during the winter:

- Opposite branching
- Gray-brown bark with rough vertical grooves
- Buds are slender, pointed and brown
- Side buds occur singly
- Twigs are glossy and reddish brown

The Size Must be Right

Once you have identified your sugar maples trees, you will then need to determine if they are big enough to tap. To ensure best conservation practices, a tree needs to be at least 10 inches in diameter (measured 4 ½ feet above the ground). Tapping a tree smaller than this will hurt the tree and put it at risk for disease and death. Typically, 75% of the tree's sap yield is collected through the first tap; therefore, sugar farmers typically only put one tap in the tree and tap more trees for best conservation practices. Never place more than three taps in a tree.

Tree Diameter (in.)	Max. # of Taps
< 10	Do Not Tap
10 - 15	1
15 - 20	2
20 - 25	3

Gather Supplies

- Tap (spile or spout): Two common sizes – 7/16th & 5/16th inch or can be homemade.
- Drill bit that matches your tap size.
- Cordless Drill.
- Hammer.
- Collecting Container: industrial sap buckets, bags, painters buckets or milk jugs.
- Container lid that will keep rain and other materials out of sap while on the tree.
- Five gallon or larger containers to collect and store large amounts of sap.
- Funnel and wire mesh coffee filter
- Evaporator pan: can be purchased or use an old kettle or dutch oven.
- Heat source: you can choose to heat over a wood fire or use a propane fish fryer.
- Thermometer that can read up to 260°F.
- Filters: can be commercial grade or cheesecloth.
- Syrup containers: can be purchased or use mason jars.

Tree Tapping

When to Tap?

The sugaring season is directly controlled by the weather. Thirty-two degrees Fahrenheit (32F), the freezing temperature, is the magic number in the sugaring process. Temperatures must get below freezing at night and above freezing during the day on a regular basis. In Missouri, this weather pattern generally occurs for 6 weeks from the end of January through the end of February. It is best to tap the trees in mid to late January. Tapping the trees too early can cause the tap hole to "dry" out due to micro-organism growth in the tree tissue. You can re-drill a hole later in the season for a fresh cut if you suspect you've tapped too early.

Putting In Taps

It is important to match up your drill bit with the size tap you are going to use for a snug fit. Drill a hole about 1½ - 2 inches into the tree at a slight upward angle, far enough to hit the xylem (sapwood), but not too far to hurt the tree. A piece of tape on your drill bit will help to ensure drilling to the correct depth. Hammer your tap into the hole and hang your bucket and lid. In following years, make sure to drill 2-3 inches left or right and 6 inches above or below the previous drill hole to avoid scar tissue and for better conservation practices. Over the years, the tapping pattern should create a spiral pattern around the tree.

Types of taps:
Aluminum 7/16 inch diameter (top), plastic health spout 5/16 inch (middle) and a home made wooden spout. A smaller hole in the tree is more healthy allowing for quicker healing.

Tape at 2 inches on a drill bit is an easy to see depth marker for tapping.

All Things Sap

Collecting

- Sap flows best when temperatures fall below the freezing point at night and rise well above freezing during the day. When conditions are ideal, you might have to collect sap from your buckets a couple of times a day as the sap will flow quite a bit out of the tree.
- As you collect sap from the tree, you might find other "visitors" in your sap, such as moths and ants. This is not a problem and can be easily solved by filtering your sap as you pour it into your 5 gallon collection container. A wire mesh coffee filter works well for this.
- Once sap has been collected, it can stay refrigerated up to 7 days and be frozen for up to 1 year.
- If the sap turns cloudy, it should be thrown out.
- The season is officially over when the leaf buds on the trees open up. When this occurs, the sap has changed and is no longer usable for maple sugaring. At this point, the taps need to be pulled from the trees so the hole can heal.

Straining sap through a wire mesh coffee filter helps keep "visitors" out of your sap during collection.

Sap to Syrup

ATTENTION- Cooking/boiling sap needs to be done outdoors. The large amount of evaporated water will cause indoor walls to become sticky and will be a haven for mold. We recommend waiting until the finishing process before bringing the sap indoors.

Cooking Sap

- Simply put…you cook the sap to make syrup! Taking collected sap and turning it into syrup is done through the evaporation process. Water is evaporated from the sap and a higher concentration of sugar is left. Although this process sounds easy, it is very long depending upon your heat source. It can take anywhere from 25-35 hours to boil off enough water to make one gallon of maple syrup.
- During the evaporation process, a white foam forms on the surface. Make sure to skim this off to increase surface area for evaporation. You can purchase sap defoamer if you wish to assist in this process.
- If you are unable to control your heat source accurately, cook the size batch you desire until you have approximately 2-3 gallons remaining in your pan. Remove this “protosyrup” from the evaporator pan and finish it on your kitchen stove where you can control the heat and not burn your syrup or surpass the syrup stage. Make sure your exhaust fan is running.

A propane burner is a great way to get started cooking sap.

Locally collected wood fires using cinder blocks or fire pits take a bit of effort, but are excellent, environmentally friendly cooking options.

Syrup Finishing

Knowing When It's Done

- To know with 100% accuracy when your sap has turned into syrup, you will need to purchase a hydrometer and testing cup. For most home producers, however, taking the temperature is accurate enough.
- **Sap has turned into syrup when it reaches 219.2F**. The color can vary depending on when in the season the sap was collected, and the syrup is not thick as one would expect. A candy thermometer will help determine the temperature.
- When the syrup is finished, it consists of 67% sugar and 33% water.

Filtering

Once the syrup reaches 219.2F, the syrup still has impurities in it known as niter which needs to be filtered. Skipping this process will alter the flavor of your syrup and niter is not healthy for young children in large quantities. A commercial filter tank and filter can be purchased, however cheesecloth and a cone filter can be used to filter the niter out as well. Once the syrup has been filtered, it can be canned or bottled for storage.

New (left) and used (right) commercial grade filters.

Niter is the impurities removed during filtering.

Syrup Grading

Color and Flavor

Syrup is judged according to a "grading" system established by the US Department of Agriculture (USDA). Although the USDA has set standard regulations, many of the main maple syrup producing states have stricter laws in regards to grading. States that do not have a state grading requirement, which includes Missouri, may sell syrup ungraded or may use the USDA grading standards. These grading systems are primarily reliant upon the syrup's color; however density, flavor and a few other factors are also considered. Several factors can influence the color of the syrup including method of production, year of production and when during the season the sap was collected. Typically, the earliest sap collected yields the lightest colored syrup. Each grading system has unique names for the different grades. Below is the USDA grade designations:

- **U.S. Grade A Light Amber:** The lightest of all maple syrups, with a delicate mild flavor. Usually it is made in the earliest part of the season before the weather warms up.
- **U.S. Grade A Medium Amber:** Somewhat darker, with a stronger maple taste, usually made at mid season.
- **U.S. Grade A Dark Amber:** Usually has a caramel tone, it is strongly flavored syrup.
- **U.S. Grade B for Reprocessing**
- **Substandard**

Lighter color syrup has a lighter flavor. Darker syrups have a more robust maple flavor.

Beyond Syrup

More than syrup can be made from the sap of a sugar maple tree. Below is a list of additional sweet products that can be made by continuing the evaporation past the syrup stage:

- **Maple Butter** — 232.7F – Once the temperature is reached, submerge pan with contents into a ice cold water bath (do not allow water to enter the maple butter), followed by slow stirring by hand until it reaches the consistency of peanut butter and looses the glossy sheen.
- **Sugar-on-Snow** — 234-239F – Once the temperature is reached, pour the heated syrup immediately (without stirring) onto fresh snow or crushed ice. Consistency should be like taffy.
- **Granulated Sugar** — 251.6F – Once the temperature is reached, allow to cool to 200°F. Stir with electric mixer until granulation occurs.

Resources

Rockwoods Reservation

636-458-2236

The Naturalist staff are available to assist you in your Maple Sugaring. We have many years of experience in perfecting, modifying and adapting our operation. Contact us at any time and we'll be glad to share our success and failures with you.

External Resources and Equipment Suppliers

- *North American Maple Syrup Producers Manual Second Edition*, Ohio State University Extension, 2006
- *Sweet Maple: Life, Lore & Recipes from the Sugarbush*, James M. Lawrence & Rux Martin, 1993
- *Backyard Sugarin' A Complete How-To Guide Third Edition*, Rink Mann, 2006
- *Reviving a Sweet Tradition*, Missouri Conservationist, Volume 72, Issue 1, January 2011
- Leader Evaporator Inc.: www.leaderevaporator.com / Phone: 802-868-5444
- Tap My Trees, home maple sugar supplier: www.tapmytrees.com / Phone: 888-990-9948

The Facts on Sugaring

- The temperature must drop below 32F at night and above 32F during the day for the sap to flow.
- Sugar maple trees have the highest concentration of sugar in their sap, up to 3%.
- One tap will yield 5 to 15 gallons of sap in a season.
- Forty gallons of sap will yield 1 gallon of syrup.
- The hole from a tap should heal within a couple of years.
- Once sap is collected, it will stay fresh in a refrigerator for up to seven days and can stay frozen up to 1 year.
- Nutritional Content of pure maple syrup: 68% Carbohydrates, 50 calories/Tablespoon, includes traces of calcium, potassium, sodium, B vitamins, and iron.
- Common commercial syrups are actually made with high fructose corn syrup and contain little or no real maple syrup.
- Cost of a gallon of real maple syrup at the store can be $40-$75 per gallon depending on quality and season.
- Through good conservation practices, you can tap a tree year after year and take part in this sweet tradition.

Get out there and discover nature! Your Maple Sugaring adventure is in your very own backyard.

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